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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,202	06/21/2001	Thomas M. Pratt	10001.001100 (NVLS 432)	9203

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EXAMINER
MOORE, KARLA A

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/887,202	PRATT ET AL.	
	Examiner	Art Unit	
	Karla Moore	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2003* .

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *22* is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *11* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,619,572 to Rathmann et al., in view of U.S. Patent No. 4,624,617 to Belna, in view of Japanese Patent No. 10-178083 A. to Takada et al., and in view of U.S. Patent No. 6,305,895 to Ozawa et al.

3. Rathmann et al. disclose a magnetically coupled linear servo drive mechanism, which is capable of being used in a load lock of a semiconductor fabrication system, substantially as claimed in Figures 1-2 and 9-10. The mechanism comprises: a carriage (Figures 2 and 9, multiple part numbers, 25-26 and 152) for holding a wafer; a driven magnet (166) within the carriage; a guiding mechanism (small rails, column 10, rows 14-16) for guiding the carriage linearly; a cylindrical tube (Figure 10, 159) housing an actuator (multiple part numbers; 160, 164, 165) and isolating the actuator from a wafer environment in the vacuum transport system (17); a driving magnet array (165) inside the cylindrical tube and mounted to an output (nut, 17) of the linear actuator, the driving magnet array magnetically coupled to the driven magnet mounted within the carriage, the actuator magnetically coupled to the carriage; and an engine (150) coupled to the actuator (column 10, rows 7-20 and column 10, row 59 through column 11, row 17). Rathmann also disclose reactors (Figure 1, 12 and 13) for processing at least one semiconductor wafer.

4. However, Rathmann et al. fail to teach the driven magnet comprising an array of magnets.

5. Belna teach the use of an array of driven magnets (Figure 4, 42, 46 and 48) wherein a portion of the magnets (42;column 3, rows 4-20) are provided for imparting a linear movement along a track and a portion of the magnets (46 and 48; column 3, rows 21-31) are provided for providing levitation to the carrier.

6. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an array of driven magnets in Rathmann et al. in order to provide both linear movement and levitation to a substrate carriage as taught by Belna.

7. The prior art discloses the invention substantially as claimed and as described above.

8. However, Rathmann et al. fail to disclose a controller coupled to the engine to control the engine for optimizing transfer times and controlling acceleration.

9. Takada et al. teach the use of a controller (C) coupled to the engine (M) which drives drive means (R) for the purpose of shortening the time required for transfer processing by setting the speed and the transfer acceleration within a range causing no shift of the substrate (W) (abstract and Figure 1).

10. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a controller coupled to the engine in Rathmann et al. in order to shorten the time required for transfer processing by setting the speed and the transfer acceleration within a range causing no shift of the substrate as taught by Takada et al.

11. The prior art discloses the invention substantially as claimed and as described above.

12. However, Rathmann et al. fail to disclose at least one load lock directly coupled to the reactor and housing the magnetically coupled linear servo-drive mechanism to translate wafers to and from the reactor.

13. Ozawa et al. teach the use of a load lock coupled to a reactor and housing a magnetically coupled linear servo-drive mechanism for the purpose of translating wafers to and from the reactor (abstract).

14. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a load lock coupled to a reactor and housing a magnetically coupled linear servo-drive mechanism in the prior art in order to translate wafers to and from the reactor as taught by Ozawa et al.

15. With respect to claim 2, while the reactors of Rathmann et al. have are intended to be used for an etching process, they would also be capable of performing CVD (the intended use of the present claimed invention).

16. The courts have ruled a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" of the prior art apparatus teaches all the structural limitations of the claim. Ex Parte Masham, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

17. With respect to claim 7, the guiding mechanism includes a linear ball slide, with the sliders (152) acting as the ball.

18. With respect to claim 8, Rathmann et al. further disclose the cylinder is stainless steel (column 10, rows 61-63), which may be attracted to a magnet, but is not magnetic itself.

19. With respect to claim 9, the shaft is a ball screw shaft, with nut (164) acting as the ball.

20. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rathmann et al., Belna, Takada et al. and Ozawa et al. as applied to claims 1-2 and 7-9 above, and further in view of French Patent No. 2766028 A1 to Lemarquand et al.

21. Rathmann et al., Belna, Takada et al. and Ozawa et al. disclose the invention substantially as claimed and as described above.

22. With respect to claim 4, Rathmann et al. further disclose the actuator of the mechanism, comprising: a shaft (160) coupled to a pulley system (162), the pulley system coupled to the engine; a nut (164) coupled to the driving magnet array (165), the driving magnet array includes magnets arranged radially, the nut coupled to the shaft such that the nut moves axially along the length of the shaft when the shaft rotates (column 10, rows 7-20 and column 10, row 59 through column 11, row 17).

23. However, none of the above prior art teach the driving magnet array or the driven magnet array including at least two permanent magnets having alternating polarities and each of the magnet arrays having the same number of magnets.

24. Lemarquand et al. teach the use of at least two permanent magnets of opposite polarities for the purpose of increasing magnetic mass and hence torque without involving difficult machining of very hard materials. Lemarquand also teach that the invention may be practiced with each of the arrays having the same number (or a different number) of magnets (abstract).

25. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention to have provided driving and driven magnet arrays comprising the same number of permanent magnets of opposite polarities in the prior art in order to increase magnetic mass and hence torque without involving difficult machining of very hard materials as taught by Lemarquand et al.

26. Claims 10, 16-18 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,619,572 to Rathmann et al., in view of U.S. Patent No. 4,624,617 to Belna and in view of Japanese Patent No. 10-178083 A. to Takada et al.

27. Rathmann et al. disclose a magnetically coupled linear servo drive mechanism, which is capable of being used in a load lock of a semiconductor fabrication system, substantially as claimed in Figures 1-2 and 9-10. The mechanism comprises: a carriage (Figure 2, 25 and 26) having a first magnet (166); a guiding mechanism (163) for guiding the carriage linearly; a cylinder (Figure 10, 159) housing an actuator (multiple part numbers; 160, 164, 165), the actuator magnetically coupled to the carriage using a second magnetic array (165); and an engine (150) coupled to the actuator (column 10, rows 7-20 and column 10, row 59 through column 11, row 17).

28. However, Rathmann et al. fail to teach the first magnetic/driven magnet comprising an array of magnets.

29. Belna teach the use of an array of driven magnets (Figure 4, 42, 46 and 48) wherein a portion of the magnets (42;column 3, rows 4-20) are provided for imparting a linear movement along a track and a portion of the magnets (46 and 48; column 3, rows 21-31) are provided for providing levitation to the carrier.

30. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an array of driven magnets in Rathmann et al. in order to provide both linear movement and levitation to a substrate carriage as taught by Belna.

31. The prior art discloses the invention substantially as claimed and as described above.

32. However, Rathmann et al. further fail to disclose a controller coupled to the engine to control the engine for optimizing transfer times and controlling acceleration.

33. Takada et al. teach the use of a controller (C) coupled to the engine (M) which drives drive means (R) for the purpose of shortening the time required for transfer processing by setting the speed and the transfer acceleration within a range causing no shift of the substrate (W) (abstract and Figure 1).

34. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a controller coupled to the engine in Rathmann et al. in order to shorten the time required for transfer processing by setting the speed and the transfer acceleration within a range causing no shift of the substrate as taught by Takada et al.

35. With respect to claim 16, Rathmann et al. further disclose two guide shafts (column 10, rows 61-63).

36. With respect to claim 17, Rathmann et al. further disclose the cylinder is stainless steel (column 10, rows 61-63), which may be attracted to a magnet, but is not magnetic itself.

37. With respect to claim 18, the shaft is a ball screw shaft, with nut (164) acting as the ball.

38. With respect to claims 20 and 21, similar to the system disclosed above, the combination of Rathmann et al. and Takada et al. also teach a method for linearly translating (using optimized motion) a wafer in a semiconductor fabrication system, comprising: placing a wafer on a carriage; magnetically coupling an actuator to the carriage, the actuator isolated from a vacuum environment; and translating the actuator linearly with controlled acceleration, which in turn translates the carriage, holding the wafer, linearly due to the magnetic coupling.

39. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rathmann et al., Belna and Takada et al. as applied to claims 10,11 16-18 and 20-21 above, and further in view of French Patent No. 2766028 A1 to Lemarquand et al.

40. Rathmann et al., Belna and Takada et al. disclose the invention substantially as claimed and as described above.

41. With respect to claim 13, Rathmann et al. further disclose the actuator of the mechanism, comprising: a shaft (160) coupled to a pulley system (162), the pulley system coupled to the engine; a nut (164) coupled to a second magnet array (165), the second magnet array includes magnets arranged radially, the nut coupled to the shaft such that the nut moves axially along the length of the shaft when the shaft rotates (column 10, rows 7-20 and column 10, row 59 through column 11, row 17).

42. However, Rathmann et al. and Takada et al. fail to teach the first magnet array or the second magnet array including at least two permanent magnets having alternating polarities and each of the magnet arrays having the same number of magnets.

43. Lemarquand et al. teach the use of at least two permanent magnets of opposite polarities for the purpose of increasing magnetic mass and hence torque without involving difficult machining of very hard materials. Lemarquand also teach that the invention may be practiced with each of the arrays having the same number (or a different number) of magnets (abstract).

44. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention to have provided first and second magnet arrays comprising the same number of permanent magnets of opposite polarities Rathmann et al. in order to increase magnetic mass and hence torque without involving difficult machining of very hard materials as taught by Lemarquand et al.

Allowable Subject Matter

45. Claims 11 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

46. The following is a statement of reasons for the indication of allowable subject matter: With respect to claim 11, the prior art fails to teach or fairly suggest the first magnet array forms a magnetic rotation lock with the second magnetic array. With respect to claim 19, the prior art does not teach or fairly suggest a magnetically coupled linear servo-drive mechanism for use in a load lock of a semiconductor fabrication system as recited in claims 10-13 and further comprising a four-axis gimbal between the nut and the second magnet array.

47. Claim 22 is allowed.

48. The following is an examiner's statement of reasons for allowance: the prior art fails to teach or fairly suggest the first magnet array forms a magnetic rotation lock with the second magnetic array.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

49. All 112 rejections are withdrawn.

50. Applicant's arguments, see Paper No. 9, filed 04/28/03, with respect to the rejection(s)of claim(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 4,624,617 to Belna.

Conclusion

51. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 06/16/03 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609(B)(2)(i). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date

of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
July 9, 2003

Primary Examiner
AU 1763